

Optimizing Drip Irrigation Management for Improved Water and Nitrogen Use Efficiency

Project Leader:

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Objectives

1. Document the importance of drip irrigation and fertigation on nitrate leaching losses.
2. Investigate techniques to rapidly measure soil moisture and soil and plant tissue N levels.
3. Disseminate information to growers.

Summary

Irrigation scheduling techniques were studied to optimize yield and water use efficiency. The study showed that the use of reference evapotranspiration (ET_0) for California Irrigation Management and Information Systems (CIMIS) adjusted for crop growth stage accurately predicts crop water needs. Studies of the effect of N fertigation levels on pepper and tomato resulted in the development of N sufficiency guidelines at various growth stages.

The effects of drip irrigation and fertigation management on nitrate leaching were evaluated by the use of buried anion exchange resin bags. Results showed that these traps were at least partially successful in distinguishing differences in seasonal nitrate losses among treatments. The study also investigated the use of suction lysimeters, portable nitrate selective electrodes and a leaf reflective meter for field N monitoring. The investigation showed that suction lysimeters are best used to determine root zone nitrate sufficiency rather than deficiency.

Project Publications

Hartz, T.K., M. LeStrange and D.M. May. 1993. Nitrogen requirements of drip-irrigated peppers. HortScience 28:1097-1099

Hartz, T.K. 1996. Water management in drip-irrigated vegetable production. HortTechnology 6:165-167

Hartz, T.K. and G.J. Hochmuth. 1996. Fertility management of drip-irrigated vegetables. HortTechnology 6:168-172